NSA Q&A: Looking for a few good cybersecurity pros. **PAGE 10 ▶**

NETWORKWORLD

THE CONNECTED ENTERPRISE ≡ NOVEMBER 19, 2012

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BE A HERO FOR THE HOLIDAYS

2012 COOL YULE TOOLS

Our team of editors and writers has pored over more than **150 different gadgets** and **gizmos** to assemble this holiday gift guide. **We guarantee it will make you a hero** and make your gift recipients smile as they open the box. **PAGE 22 ▶**

techdebate

Daniel Ayoub Rand Wacker

SECURITY: On-premise or in the cloud?

PAGE 18 ▶

Which carrier has the most 4G coverage?

BY JOHN COX

"WHO HAS the most 4G coverage?"

That's a deceptively simple question. And the answer to it is an unsatisfying but accurate, "It depends."

It depends on what one means by "4G," by "coverage" and even by "most."

The U.S. is one of the fastest-growing 4G markets in the world, thanks to aggressive LTE deployments by Verizon Wireless and AT&T, and availability of popular LTE smartphones like the recently released Apple iPhone 5 and the Samsung Galaxy S III, not to mention a growing number of tablets.

▶ *See* **4G,** *page 30*

HP Converged Infrastructure and the Cloud

Duncan Campbell

VP OF MARKETING, HP CONVERGED INFRASTRUCTURE
HEWLETT-PACKARD COMPANY

Duncan Campbell is the leader of the Enterprise Group Solutions Marketing team. In this role, Campbell is responsible for the Marketing Strategy and the Solutions content development for: HP Converged Infrastructure, Application Transformation, Information Optimization, Security and Risk Management, Mobility and SMB. Campbell brings more than 25 years of enterprise and midmarket marketing experience to this leadership team.

The essential foundation for any cloud deployment

Duncan Campbell, vice president of worldwide marketing for converged infrastructure at HP Enterprise Group, shares with Computerworld his insights on the HP Converged Infrastructure.

IT increasingly views the cloud as a strategic business enabler. How is HP helping IT departments reach their cloud goals more safely, quickly, and easily?

To truly deliver on the "services anywhere" promise, organizations must think differently about IT. Successful organizations create the right mix of on- and off-premise services by leveraging the best of traditional IT, private, managed, and public cloud for a seamless infrastructure experience.

Recognizing that one size does not fit all when it comes to cloud adoption is crucial. To make the process easier, faster, and safer, we must acknowledge that different customers require different on-ramps and delivery models.

HP fully understands this. That's why earlier this year we introduced the HP Converged Cloud approach and portfolio, which delivers solutions based on a single common architecture and open-standards approach. It gives customers choice, consistency, and confidence across infrastructure, applications, and information.

What is the relationship between the Converged Infrastructure and the Cloud?

The HP Converged Infrastructure helps IT enable business success by accelerating the time-to-value of applications and services. This can only be achieved with an infrastructure or data center that is simpler, more flexible, more efficient, and less expensive to operate. The infrastructure also needs to be cloud-ready.

That's exactly what the HP Converged Infrastructure delivers. Organizations can build, secure, and manage their cloud environments, and utilize off-premise cloud services or access services when needed. This type of broad portfolio of integrated software and hardware solutions and services lets our customers fast-track to the cloud—in as little as one month—or take a step-by-step approach, expanding into the cloud when their processes, organizations, and governance are ready. The HP Converged Infrastructure, powered by Intel, is the essential foundation for IT today and into the future.

Why is a Converged Infrastructure critical for IT and the business?

Organizations need the best infrastructure possible to compete and grow in today's fast-paced, mobile business world. But aging infrastructures and facilities are limiting business agility and draining IT budgets.

Most customers tell me the same story: Their IT infrastructure is too complex, too costly to operate, and too slow to respond to business needs. What I hear is supported by research findings. Organizations now spend upwards of 70 percent of their IT resources on operations and activities that keep the lights on, as it were, when what they should be spending it on is innovation.

What differentiates the HP Converged Infrastructure and cloud approach?

There are three huge differentiators.

First, HP solutions are designed upfront with convergence in mind. Our R&D teams develop products and integrated solutions across all key areas of IT infrastructure—servers, storage, networking, data center design, and IT management.

Second, our solutions are open, not closed. Our modular building-block approach enables flexibility and portability across deployment models, which is critical for cloud solutions that must extend across infrastructure, applications, and information. We listen and don't dictate to our customers choices on operating systems and hypervisors. We've built our HP Converged Infrastructure and Converged Cloud architecture with our partners in mind, which enables us to leverage an already second-to-none partner ecosystem, and train and deliver the broadest set of solutions in the industry.

Third, as a trusted technology advisor, HP brings decades of proven, reliable experience helping customers meet their most demanding data center challenges. It's our vision and execution that gives customers around the world the confidence that HP is the right partner for success.

Please call HP or your certified channel partner to learn more what we can do to help you accelerate IT for better business results. Brought to you by HP and Intel®

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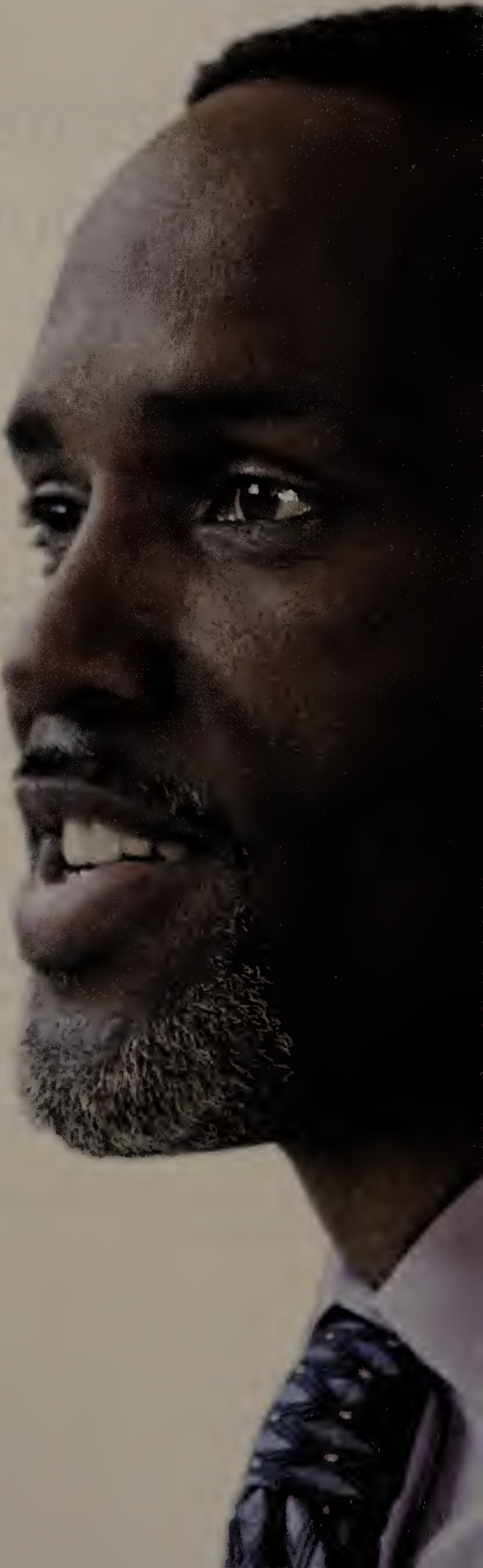

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***Substantiation:** IDC white paper sponsored by HP, *Measuring the Business Value of Converged Infrastructure in the Data Center*, October 2011

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NETWORKWORLD

FROM THE EDITOR | JOHN DIX

Big Switch arrives

The march toward software-defined networking will be a long slog given current investments in the installed base, but industry forces are coalescing rapidly in anticipation of the huge benefits to be reaped from this fundamental shift in the way we build and run networks.

Besides a host of legacy players that are now on board — including the likes of HP, Brocade, Juniper, Arista, Extreme and even Cisco with its investment in Insieme — the movement got a boost last week when Big Switch Networks, an SDN poster child, unveiled the commercial availability of a product portfolio that has been years in the making (see story, page 15).

Big Switch is a core player because one of its co-founders, Guido Appenzeller, headed the Stanford University lab that developed the OpenFlow v1.0 protocol and the reference switch and controller implementations. Together these make it possible for software on a SDN controller to command a network full of OpenFlow-enabled data handling devices, centralizing, homogenizing and simplifying that otherwise weighty task.

The Big Switch announcement is particularly important because last January the company made the core of its Big Network Controller available as an open source project called Floodlight, and that effort is gaining widespread support among the academic, vendor and user communities. Jason Matlof, Big Switch vice president of marketing, says Floodlight has been downloaded more than 10,000 times this year.

That's heady stuff for a young company and may help ensure some future success, particularly when it comes to ensuring there are lots of compatible controllers out there for the other components in Big Switch's roll out: the first two apps for the controller.

The real magic of SDN, after all, will be driven by the applications that ride on top of and take advantage of the software-controlled network. Big Switch's first two include a tool for building virtual networks and another for centrally monitoring your SDN. But if Floodlight is widely embraced, we can expect a host of other apps — for everything from traffic engineering to network access control — to emerge from all corners of the community. Matlof says Big Switch partners have five other core apps in beta now.

Ultimately the industry needs a standard for the northbound connection from the controller to those apps, just as OpenFlow fulfills that roll on the southbound side to the data handling gear. That would enable any SDN app to run on any controller. Big Switch's principal architect, Rob Sherwood, is leading that effort at the Open Networking Foundation, but it is still early days.

In the meantime, Big Switch's efforts on the open source front with Floodlight position it nicely. The company's coming-out party is an important milestone in the march toward SDN.

John A. Dix

inside

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peersay

Questions about Amazon outage

THREE OBVIOUS QUESTIONS (Re: "Amazon cites cause of recent outage, issues refunds"; tinyurl.com/cybo6k3):

Why would AWS be making a physical hardware change at 2 p.m. on a Monday?

When will AWS realize that its automation and recovery systems seem to consistently make the outages worse ("cascading," "replication storms," etc.)?

How meaningful are partial billing credits vs. the loss of revenue suffered by some of those clients?

Kenneth L. Cameron

Votes are safer than you think

I HAVE BEEN in the business of elections for 15 years. Can machines be tampered with? Sure. Can I break into your house, bank or car if given access and time? You bet (Re: "Machines alter election votes: Hacking voting machines so easy that Grandma can do it"; tinyurl.com/a3e66y5).

The first layer is physical security. That means if you don't have any business handling voting machines you are not allowed to do so.

We once voted on paper ballots that were counted by hand. All that was required to alter votes was a stack of paper and a pen/pencil. The universe of people with the skills to "hack" the hand-counted paper ballot is huge. The universe of people with the access required to do so, not so much.

We now vote with electronic machines as well as digital scanners and paper ballots. A little more than extra paper and pencils is required to alter votes. The universe of people with the skills to hack modern machines is considerably smaller. The universe of people with the access required to make these changes is considerably smaller, as well.

Yes, machines malfunction. Yes, people make mistakes and are sometimes careless. But given sufficient testing and physical security procedures coupled with built-in security of the machines, our votes are safer than they have ever been.

ShadeTreeComputer

You have to be arrogant and brutal in leading major hardware and software development.

Bad advice regarding PC security

"AND SO YOU don't forget it, you might write it on a sticky note and attach it to the bottom of your router, or save it on your desktop PC in a Word or plain-text file" (Re: "PC security: Your essential software toolbox"; tinyurl.com/c7kg8we).

I am extremely surprised by this piece of advice. Storing access credentials in plain-text files and on sticky notes along with sharing passwords are big no-no's in the security field — you may as well invite unauthorized users onto your machine or not have any protection at all.

Why not suggest using a secure password storage application such as KeePass, or even more basic, use a passphrase as the basis for your password, something which you can memorize and then use simple, non-obvious substitution to change letters for numbers and symbols?

Matt Parkes

Using Surface RT in a superstorm

THIS WAS AN important article. Hardware makers are cutting everything they can, and some companies are still doing non-standard crap and getting away with it. This is a message to them that little things like a standard, full-size USB are important. Not only for disasters, but for the airport, etc. (Re: "How Microsoft's Surface got my family through a Hurricane Sandy outage"; tinyurl.com/9waoetn).

Michael Brown

Microsoft exec's abrupt departure

THE NEGATIVE LIGHT that Sinofsky was painted in by critics probably made him look inward at his amassed $40 million in assets and say it's not worth it anymore, just like Apple's Forstall (Re: "Why is Steven Sinofsky really leaving Microsoft?" tinyurl.com/bto982q).

Like Steve Jobs, you have to be arrogant and brutal in leading major hardware and software development, especially when surrounded by political animals. I can't imagine how competitive Microsoft is at the top considering the size of the rewards.

havasu46

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T · · Systems

US Senate keeps head buried in cybersecurity quicksand

THE U.S. SENATE last week voted against moving forward on a cybersecurity bill that supporters have called critical for national security (see our opinion tinyurl.com/955wsm4). Some Republicans have raised questions about the Cybersecurity Act, which would allow the U.S. Department of Homeland Security to set cybersecurity standards, developed with the help of private companies, for operators of critical infrastructure. And critics have said the bill gives DHS too much power and cite privacy questions, saying it would allow Internet service providers and other Web businesses to spy on customers to share information with the government without the need for a warrant. Tech trade group BSA called on lawmakers to give a high priority to cybersecurity legislation in 2013. "It is disappointing that senators haven't yet been able to reach an agreement on cybersecurity legislation — but stalemate doesn't make the issue go away," BSA President and CEO Robert Holleyman said in a statement. ***tinyurl.com/c64ke3z***

Cray bumps IBM in supercomputer rankings

THE U.S. Department of Energy Oak Ridge National Laboratory's newly installed Titan system, a Cray XK7, has been anointed the world's fastest supercomputer in the latest Top500 compilation. Titan knocked from the top spot the DOE Lawrence Livermore National Laboratory's Sequoia supercomputer, an IBM BlueGene/Q system. Under the Linpack benchmark, Titan executed 17.59 petaflops and Sequoia executed 16.32 petaflops (a petaflop is a thousand trillion). Also in the top five were the RIKEN Advanced Institute for Computational Science's K supercomputer, a Fujitsu system; The DOE Argonne National Laboratory's Mira, a BlueGene/Q system; and the German Forschungszentrum Juelich's Juqueen, also an IBM BlueGene/Q system. The U.S. continues to dominate the list, hosting 251 of the top 500 systems. ***tinyurl.com/btubg48***

$1.5 million airport iPad heist

TWO THIEVES stole some $1.5 million in Apple iPad minis from a JFK airport cargo building, according to the *New York Post*. The theft of 3,600 iPads took place on Nov. 12 shortly before midnight. The thieves allegedly used one of the airport's forklifts to load two pallets of iPads into a truck, leaving a few other pallets behind after being confronted by an airport worker. ***tinyurl.com/cj9ouye***

PARITY BITS

$1.1BILLION

How much more revenue Apple made selling iPhones and iPhone services last quarter than Microsoft generated in total sales for the quarter.

VIDEO

Military mines Twitter data for intelligence

Researchers and students at the Naval Postgraduate School in Monterey, Calif., are developing tools to collect targeted data from social media. One piece of Twitter software is already in beta version, being used overseas. *tinyurl.com/d27kkon*

Extreme joins Cisco, Brocade, Huawei at 100G

EXTREME NETWORKS last week unveiled 100G and 40G Ethernet modules, as well as SDN application support, for its BlackDiamond X8 core switch. Extreme's 100/40G XL modules are designed to help scale BlackDiamond X8 networks for virtualized multi-tenant cloud data centers, Internet Exchanges and data center core deployments. They are capable of scaling to 1 million route entries, and hundreds of thousands of addresses and flows through an upgraded TCAM, and can logically segment multi-tenant networks with Layer 2 broadcast domains, Extreme says. Extreme joins Cisco, Brocade and Huawei as suppliers of 100G Ethernet for data centers. Juniper and Alcatel-Lucent, as well as Cisco and Brocade, provide it for service provider core and edge routing. ***tinyurl.com/cfkveju***

Air Force scraps massive ERP project

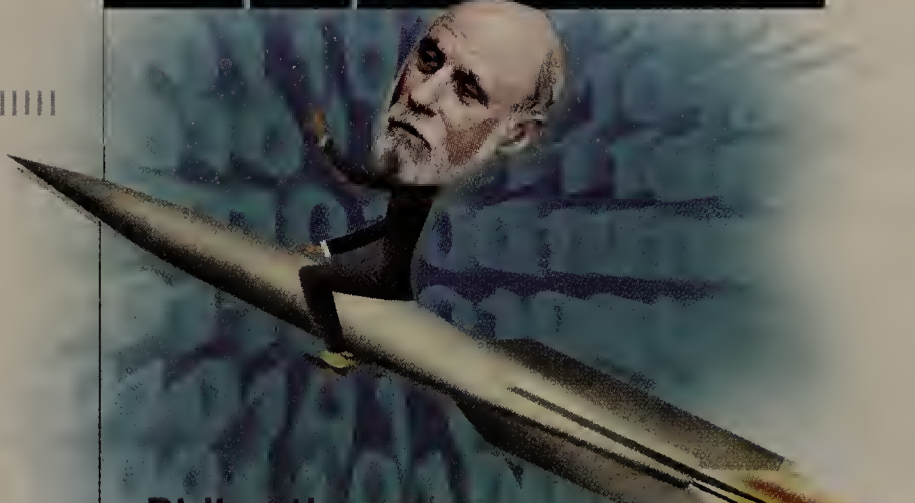
U.S. AIR FORCE

AFTER RACKING up $1 billion in costs since 2005, the U.S. Air Force has decided to scrap a major ERP software project, concluding that finishing it would cost far too much money for too little gain. The Expeditionary Combat Support System "has not yielded any significant military capability," an Air Force spokesman said in a statement. "We estimate it would require an additional $1.1 billion for about a quarter of the original scope to continue and fielding would not be until 2020." Air Force officials restructured the program three times within the past three years, and ultimately determined the military division "will be better served by developing an entirely new strategy vs. revamping the ECSS system of record again." ***tinyurl.com/ce72wwa***

Performance fix targets overused Wi-Fi points

THREE RESEARCHERS from North Carolina State University have developed a software protocol that better manages high traffic loads on a Wi-Fi router when too many users connect. The IEEE's 802.11 specification allows clients connected to a Wi-Fi access point to share the same transmission channel, but downlink traffic eventually surpasses uplink traffic, causing packet loss. The researchers' protocol, called WiFox, monitors the traffic and implements a "priority" mode when a router is in danger of being overloaded. In tests, a WiFox-enabled router was able to respond an average of four times faster than a network not using the protocol. ***tinyurl.com/bsv2gxl***

GOOD BAD UGLY



good

Riding the energy network rocket

THE 100GBPS Energy Sciences Network is now the fastest science network in the world, according to the Department of Energy and Lawrence Berkeley National Laboratory, which manages the network. ESnet links the national laboratory system, its supercomputing centers and major scientific instruments at speeds 10 times faster than the previous network. The network is designed to support research into everything from clean energy to climate change and the overall nature of the universe. "In January 1983, the Internet was launched into operation on a 50 Kbps ARPANET backbone. 30 years later, ESnet backbone speeds are two million times faster," said ESnet Policy Board member Vint Cerf. "Terabit speeds are in sight and faster aggregate speeds can be anticipated. Talk about riding a rocket!"

bad

Phishers picking on CloudFlare

CUSTOMERS OF the popular CloudFlare website acceleration and security service have been targeted in an email attack that directed them to a fake version of the website. Reports about spoofed CloudFlare emails that contained links to a phishing website were posted last week on the company's support forum by customers. The rogue messages masqueraded as CloudFlare alerts about account load limits being exceeded. The company was able to determine that around 200 customers had clicked on the rogue link in the spoofed emails before the phishing website was taken down. All of those customers had their passwords reset.

ugly

IBM: Who are you calling reckless?

IBM HAS been slapped with a multimillion-dollar lawsuit by chemical products manufacturer Avantor Performance Materials, which alleges that IBM lied about the suitability of an SAP-based software package it sells in order to win Avantor's business. Avantor found that the Express Life offering was "woefully unsuited" to its business and the implementation brought its operations to "a near standstill," according to the suit. IBM also violated its contract by staffing the project with "incompetent and reckless consultants." IBM said it disagreed with the claims.

NSA: Looking for a few good cybersecurity pros

Agency partners with academia to train students for careers in cybersecurity

At a time when cyberattacks on America's critical infrastructure have increased 17-fold (between 2009 and 2011), the need for highly trained cybersecurity professionals is acute. However, 83% of federal hiring managers in a recent survey said it was extremely difficult to find well-trained cybersecurity professionals and a projected shortfall of 20,000 to more than 40,000 people is expected in the years to come. The National Security Agency (NSA) is doing something about this cyberskills gap by partnering with the nation's service academies, colleges and universities to foster the growth of the world's most advanced cybersecurity professionals.

Lt. Matthew Greene (left) and Lt. Maxwell Love talk with *Network World*. Both are members of the West Point Class of 2012, as well as NSA interns.

Recently, *Network World*'s Dirk A.D. Smith was invited to visit the Puzzle Palace and interview two interns, one of whom said his time there has caused him to completely lock down his Facebook page, cellphone and computer because "in the world of cybersecurity a single person can do something really bad."

While the NSA is known for its supersecrecy, it has a long history of working with educational institutions. Programs are divided into Cooperative Education, Internship and Scholarships. The Cooperative Education Program is a rotational program with students alternating semesters of full-time work with full-time study. During the work tour students put in a standard 40-hour week with each tour designed to reveal specific areas of interest and skills that they can then focus on for a career. The internships, at the high school, college and graduate levels, run the gamut from cryptanalysis, cybersecurity and information assurance to human resources, occupational health, history and languages. Scholarships are available at high school, college and graduate levels. Students who graduate with NSA on their transcripts are much in demand. Correspondingly, when later at work in military, intelligence or industry, much is expected of them.

Smith recently sat down with lieutenants Matthew Greene and Maxwell Love, both 2012 graduates of the U.S. Military Academy (USMA) at West Point. With bachelor's degrees in computer science and systems engineering respectively, both were also cybersecurity interns in the NSA's Service Academy Intern Program (SAIP). SAIP complements NSA's 166 other academic-outreach programs with colleges and universities. The other programs — for both two- and four-year schools — emphasize areas such as information assurance education and even cyber-operations.

Why did you apply for the NSA intern program?

Greene: West Point allows you to do internships, not just at NSA but at any government organization as well as at Google, Cisco and universities like USC and Penn State, to name a few. I had done one with the U.S. European Command, Information Assurance Directorate, where they had just finished up their yearly cybersecurity exercise and were doing analysis. The NSA guys over there were very active helping them with the analysis and patching holes in their systems. They [NSA] pulled us into the office and said, "We'd like you to work on this project." They weren't very specific, they just said, "It's in the field right now; it's a live system, and it's going to save soldiers' lives."

Before your first time here, what did you think it would be like inside the NSA?

Love: The total stereotype. We imagined sterilized hallways and spooky people walking around. It wasn't exactly like that. There are normal people here too.

How has your perspective of the NSA changed after your internship here?

Love: The importance of the mission you take on here affected me. It's not just spooky stuff that — in your wildest imagination — they do. They have a lot of outreach toward education and research with both military and civilian people involved."

If you were talking with students at other schools studying computer science/engineering, would you encourage them to enter the field of cybersecurity?

Greene: I would. Just because, looking at it from the military's perspective, sometimes you get tunnel vision how we enforce policy and then how the Department of Defense manages its networks. Bringing in civilians with an outside perspective brings in a diverse set of knowledge; it helps us create a more secure network for us and better protection of our national security.

Love: Absolutely. The cybersecurity field is not just limited to guys who hit keyboards all day, it takes a whole new perspective and set of disciplines coming into it and it's such a rapidly evolving field night now. There are opportunities for everyone and it needs help from a lot of different kinds of people.

If they were studying other fields, would you encourage them too?

Greene: I would encourage everybody to look into the field because cybersecurity isn't just about computers, it's also about cellphones and pretty much any mobile device you can think about. Cybersecurity is more about protecting yourself, and from what I've learned at NSA I've completely changed the way I think about computing and mobile devices; I've locked down my Facebook, my cellphone and my computer. I put a lot more security on my stuff; not because I'm scared but because now I'm aware.

The general public has no idea that they can post a picture on the Internet and anybody else, with even a basic Python script, can pull the picture down and pull all the access data off it and find out where that person is literally standing at that moment! This isn't advanced cybersecurity, this is basic stuff. Everybody needs a little basic knowledge on protecting themselves.

What would you say to anyone in the public about the importance of training for cybersecurity?

Greene: Social engineering is an art. It has been around for a while and cyber capabilities — stalking online — isn't a very foreign idea anymore. You can pretty much find out where anybody is if they are not careful so everybody needs to have that good, basic knowledge. People like their privacy and they like having their money. Those are good reasons to have an understanding of cybersecurity: to protect themselves and their families.

From the perspective of protecting an office's network, is it different at the NSA than at a typical company?

Love: It's not that different because organizations, be they private sector or government, run into the same problems. You have networks to manage, lots of different users and — while we have a few special intelligence requirements — on top of that it's like any large corporate infrastructure as far as networking goes.

What do you like most about working as an intern at the NSA?

Greene: They gave us a real problem. They said, "This radio system needs improvement. Here is how it works. Figure something out." Then they let us run with it. We had deliverables, papers, updates, but other than that they kind of left us alone. They gave us equipment and said, "Tinker with it. If you fail, that's OK. At least we'll know what doesn't work.

Love: The impetus that drove everything was real. We worked to improve a real-world system and, if proved successful, it would be implemented. It would help soldiers.

What did you like the least about working as an intern at the NSA?

Greene: Can't tweet from the office. Have to leave my cellphone outside. And, oh, because of the security requirements at NSA, back up at West Point we couldn't work on certain data sets in our project because they were classified. That was frustrating because we only had one data set and, in order to get an accurate test, you've got to run more than one. We had to work our way around that and still make sure that we met the security requirements of the NSA.

So, what did you do while here at the NSA?

Love: Our project was to improve the performance of an aircraft system that picks up radio signals and figures out where that signal is coming from. We began by analyzing what this system was, right down to the gears turning in it, then asked where does it fail and how can we improve it.

Greene: I worked on the same project as Max and, last year, we did a lot of research. We talked to experts in the software and hardware fields as well as in global information systems. Basically, everyone from the nerdiest mathematician to the most hippie biker out there; we talked to 'em and we worked with 'em and we tried to come up with a solution for improving the system. In the end we pumped out a working solution, our academic paper was published and we presented our findings at a conference where we ended up talking with people in industry from Microsoft, Google Maps and Yahoo. We even got to brief the deputy director of NSA, John "Chris" Inglis, up at West Point.

Do you think a network admin or CTO from industry, with some years of experience, would have much to offer the NSA?

Love: Very much so because, as the size of an organization grows, you start to run into a lot of the same requirements. A lot of the same functions a network admin has experience with carries over to this kind of enterprise structure that we have set up.

Greene: Definitely. Depending on what their interest is — and remember that NSA doesn't just do intelligence — there are a lot of mathematicians and computer scientists doing research as well as people managing the internal networks.

What would you say about the importance of cybersecurity for military and intelligence to someone on the outside?

Greene: It's important because people need to realize that we are not the only ones doing it. There are about 20 countries that have developed cyberwarfare programs but they, unlike the United States, are not bound by the restrictions of Title 10 and Title 50. These titles prevent the NSA, CIA and all the defense agencies from spying on or monitoring U.S. citizens without a warrant, just like the police can't monitor a citizen without a warrant. But in countries that don't love America, apple pie and baseball there are state-run efforts to steal information and to disrupt our nation's IT infrastructure. The Department of Defense works hard to prevent this, but when it comes to your private computer we can give good advice but you have to take the initiative to protect yourself. Then you have to talk about non-state actors — terrorists — and there are no restrictions on them. In the world of cybersecurity a single person can do something really bad.

What about someone from NSA moving to work at a business?

Love: Oh, big time. Working here you gain an in-depth understanding not only of how the infrastructures work, stuff that you could easily apply over to the private sector, but you also get really far ahead in terms of advanced education. When you leave here you are ahead in the field and you could help any business you go to.

Who should apply to the intern program?

Love: Anyone who's interested — not just military, but a civilian school as well. Anyone who wants to get a look at the practical side of some of the theoretical stuff they have been learning.

Greene: Obviously cybersecurity guys — and gals — anyone who is interested in intelligence, signal communication, math, really anybody. We have a history major who working on the history of cryptology and we have math guys working in research math and experimental mathematics. We interact with a lot of electrical engineers, software engineers, computer science. If you have a degree or you are trying to get a degree you could pretty much work here and would find some form of interesting work. There are a lot of people making sure we follow those Title 10 and Title 50 restrictions so that we have the trust of the American public.

In general, who should apply to work at the NSA?

Love: I'd say patriotic people. Also, anyone who values competency and responsibility because there are a lot of citizens counting on you. And, if you'd like a cool job; when you come down to it it's a pretty cool place to work. ■

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[1] Based on IBM testing and documented in IBM System x® Virtualization Server Consolidation sizing methodology. IBM Flex System x240 supports 2.7X more Peak Utilization Virtual Machines (VMs) than previous generation BladeCenter® HS22V.

[2] Based on IDC white paper "The Economics of Virtualization: Moving Toward an Application-Based Cost Model," Michelle Bailey, November 2009, http://www.vmware.com/files/pdf/Virtualization-application-based-cost-model-WP-EN.pdf

Optional IBM Flex System storage node available fourth quarter 2012.

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File transfer systems adapting to a cloud world

BY BRANDON BUTLER

EMAIL IS still the dominant way to send information from one person to another. But when lots of big files are being sent, email servers can quickly start feeling the pressure, leading to degraded performance and network bandwidth strain.

This is what the managed file transfer (MFT) business addresses. Bypassing email servers, these systems are dedicated to transferring large files within organizations, between businesses and customers, or in business-to-business or application-to-application transactions. Email newsletters many times use MFTs to blast users about the latest news or promotions from their company. Financial institutions that send large numbers of documents to customers and other business partners may use MFT, too.

Gartner analyst Ben Huang estimates this market to be $700 million to $800 million per year, but that only takes into account recorded revenues. Other researchers estimate the market could be more than $2 billion.

Among the bigger players in MFT are IBM and Citrix, while a growing crop of startups such as YouSendIt aim for the small-business and consumer markets.

However, now businesses are attempting to adapt to a new cloud-based world where file transfers are not only done in the cloud, but cloud services allow for even broader capabilities compared to on-premise systems.

There's been a flurry of activity in the past few weeks by vendors specializing or competing in file transfer management. No less than a half-dozen vendors have made news, mostly about extending their platforms to include new cloud-based services. Ipswitch File Transfer could be the clearest example. The company offers a series of MFT products, including a server for on-premise MFT. Last week, though, Ipswitch announced MOVEit, a completely cloud-based MFT.

"CIOs are facing pressure to manage data," says Simon Yates, a Forrester researcher. "These are big trends around the amount of data being produced and providing ways to safely share content with a variety of users, and synch across all the devices workers are using."

Yates calls this the "anytime, anywhere" worker. Forty percent of information workers, he says, use three or more devices for work, while more than one-third of workers already use consumer-focused cloud applications, such as Dropbox, Box or iCloud. These trends are not slowing down; and MFTs are seen as one way to help to manage the flow of large amounts of data across these devices.

File transfer control

Axway Specializes in business-to-business and application-to-application MFT; recently beefed up security by purchasing Vordel.

Citrix ShareFile Citrix's ShareFile headlines the company's suite of MFT tools, which also include on-premise and cloud options, plus integration with active directory. New partnership with NetApp recently announced.

IBM Seen as MFT market leader, IBM Sterling is optimized for high-volume traffic within and between enterprises, with optional ERP and business process management tools.

Ipswitch File Transfer Offers new completely cloud-based MFT, or on-premise FTP server.

Tibco Tibco's Slingshot on-premises product offers integration with Microsoft Outlook and other messaging platforms; provides compression and encryption.

YouSendIt Cloud-based service emphasizes easy onboarding, including a free 14-day trial, and access to YouSendIt services from desktops, tablets and mobile devices; file transfers are capped at 2MB.

Vendors are looking to step in and take advantage. Huang says the industry is dominated by big-name players. IBM's Sterling is seen as the market leader on the enterprise side, Huang says, with other players like Tibco, Axway, Seeburger, Informatica, Software AG and Citrix ShareFile in the mix.

And there is the crop of smaller and mid-tier players, many of which in recent weeks have amended their products. Examples of these companies include, but are not limited to, YouSendIt, Ipswitch, Globalscape, Code-Two and Accellion.

Generally, smaller providers may have a cheaper sticker price for services, with more basic features and functionality, Huang says. Larger vendors generally have more holistic approaches with additional bolt-on features that can be integrated into the systems, bringing packages into the seven-figure range, he says. With those added features comes added complexity, plus longer sales and deployment process. Mid-tier and smaller vendors may have fewer moving parts and a more logical and faster installation.

IBM's Sterling MFT, for example, ties in ERP, and business process management features as well, helping businesses automate and streamline operations leading up to the actual transfer of files in the MFT system.

Most on-premise, behind-the-firewall MFT systems run on traditional hardware and do not require dedicated infrastructure, but they do require high-memory servers, usually with high processing power since they are designed to handle large quantities of data transfer, along with functions such as compression and encryption. Some vendors, like Ipswitch, have servers specifically designed for on-premise MFTs.

With the range of options from vendors also comes a variety of ways these systems are architected on the back end. Some are policy-based with email platforms, such as Microsoft Outlook: Any file transfer more than 1MB or 2MB can be automatically processed by the MFT, for example, helping to take the strain off email servers. Others are completely manual processes where users select which transfers would be handled by the MFT. Or, automatic processes can be put in place for application-to-application transfers, to machine-to-machine, all done through the MFT.

Customers typically begin looking at MFTs when their email servers begin getting overcrowded, or if they have consistent need for large file transfers. "If an organization is sending a 2MB newsletter to 10,000 people, that's pumping a lot of information through your network," says Michael Osterman, an independent researcher. Instead, with an MFT, that same organization can upload one copy to an MFT server and send 10,000 much smaller emails that contain a link where users can access the content on the MFT server. The bandwidth consumption of those 10,000 newsletter readers is then not happening all at once, but is spread out across a longer period of time, taking strain off the network.

Yates says IT shops have a variety of tools at their disposal, including MFT, traditional email and next-generation collaboration tools, like Salesforce's Chatter, Jive or Microsoft's Yammer. The key, he says, is for CIOs to study what users are already doing, and then either try to create policies for managing that, or give workers an alternative. ■

OpenFlow startup takes aim at Cisco, VMware

Big Switch Networks unveils products, customers, partnerships for SDNs

BY JIM DUFFY

BIG SWITCH Networks has announced the general availability of its OpenFlow-based software-defined networking products and applications, as well as customers and partners.

OpenFlow and SDNs are hyped as the networking industry's next revolution in that they have the potential to disrupt the proprietary entanglements of today's physical infrastructures through software programmability. At the same time, SDNs are viewed as a less vendor-dependent alternative to physical and virtual network offerings from Cisco and VMware, even though those two titans offer programmable network and virtualization offerings themselves.

Indeed, VMware just spent $1.26 billion to acquire network virtualization startup Nicira, reportedly out from under Cisco. Cisco, meanwhile, is funding to the tune of $100 million to $750 million a spin-in called Insieme Networks, which is believed to be developing programmable switches and a controller.

Big Switch founders Guido Appenzeller (l) and Kyle Forster

Big Switch may be the next big payoff in SDNs. Armed with $39 million in venture funding, Big Switch produced the Big Switch Open SDN product suite, which is designed to enable customers to adopt new network applications more easily than they can with traditional, non-programmable networks. The suite supports "open" standards and APIs, including OpenFlow, and is intended to be hardware platform-independent, Big Switch says.

HP is also a big proponent of OpenFlow and released a controller, 25 OpenFlow-enabled switches and applications a month ago. All OpenFlow advocates hope to disrupt the status quo.

"This represents a dramatically different environment that's not controlled by the incumbent," says Joe Skorupa, an analyst at Gartner. "Cisco is not out front [in SDNs]; they are the disruptee. The competition has demonstrated that what they have is viable. It will be hard for Cisco to say, 'It doesn't work; it's a science project; buy ours because the standard isn't ready.' This is a much, much different environment to be in."

Big Switch Networks' product suite includes Big Network Controller, which scales to more than a thousand switches and 250,000 new host connections per second; Big Tap, a unified network monitoring application designed to provide enterprise-wide network visibility; and Big Virtual Switch, a data center network virtualization application designed for automated network provisioning.

Big Network Controller includes an OpenFlow southbound programming interface, a RESTful API for northbound communications, and is based on the Floodlight open source controller code available under the Apache 2.0 license. It's designed to provide network abstraction for the physical infrastructure, policy-based functions across the fabric, and centralized intelligence for the programmable network.

Big Tap is designed to provide continuous network visibility so users can optimize the use of security tools, performance tools and network packet brokers. The application filters and directs traffic to meet the needs of analytical tools, and monitors the efficiency, performance and scalability of Ethernet switches, Big Switch says.

Big Virtual Switch supports up to 32,000 virtual network segments, enabling multi-tenancy and dynamic workload allocation, Big Switch says. It offers integration into orchestration systems, including OpenStack, CloudStack, Microsoft System Center and VMware vCenter. Big Switch says the Big Virtual Switch application enables up to 50% more VMs per rack, and up to $500,000 per rack in capital cost savings and $30,000 per rack per year in operational savings, based on a 40-server rack.

Production customers for the Big Switch Open SDN product suite include Fidelity Investments and Goldman Sachs. Ecosystem partners include A10 Networks, Arista Networks, Broadcom, Brocade, Canonical, Cariden, Citrix, Cloudscaling, Coraid, Dell, Endace, Extreme Networks, F5, Fortinet, Infoblox, Juniper Networks, Mellanox, Microsoft, Mirantis, Nebula, Piston Cloud, Palo Alto Networks, Radware, StackOps, ThreatSTOP, vArmour and Vyatta. These companies plan to support the products and develop applications to its APIs, Big Switch says.

Big Switch's challenge, naturally, will be execution, just as it is with any startup or established vendor, Skorupa says.

"They still have to build a viable business model," Skorupa says, especially with many vendors expected to eventually internally develop their own OpenFlow controllers, like HP did.

Pricing for Big Network Controller starts under $1,700 per month. Big Tap starts at less than $500 per month, and Big Virtual Switch starts at under $4,200 per month. All products are available now. ■

BYOD: Where the costs are

How to make sure that your BYOD rollout doesn't break the bank

BY MARY BRANDEL

FEW TECHNOLOGY trends have inspired as many misgivings — and as much misinformation — as BYOD, or "bring your own device." Is the idea of allowing employees to purchase and use their own laptops and mobile devices a security nightmare? A productivity boon? A drain on the service desk? And perhaps the biggest question of all, a cost-savings nirvana?

With conflicting information — and few well-managed implementations of BYOD from which to learn — confusion abounds as to whether BYOD saves money or costs more. In a survey by Xigo, a provider of cloud-based expense management, respondents named cost savings as a top goal for BYOD programs. However, most (67%) said their mobile expenditures had not changed after allowing some form of BYOD, while nearly one-quarter saw them rise. Meanwhile, in a survey by Lieberman Software, most respondents (67%) said BYOD would increase IT and security costs.

"People might think, 'I don't have to buy laptops or tablets anymore, so this is going to save me money,'" says Paul DeBeasi, research vice president at Gartner. But because hardware expenditures are far lower than other hidden costs of BYOD, he says, the question is not whether costs will go down but whether they will rise or stay the same. "BYOD probably will not save you money," DeBeasi says.

While others believe cost savings can be had, they are only achievable when costs are recognized and strategically managed through well-designed policies, says Hyoun Park, principal analyst at Nucleus Research. However, "most companies do not do BYOD in a cost-effective manner," he says.

With that in mind, we have investigated the costs that must be either counted or reined in to pursue BYOD cost-effectively.

In a survey by Xigo, a provider of cloud-based expense management, respondents named **COST SAVINGS AS A TOP GOAL FOR BYOD PROGRAMS.**

COST CATEGORY 1
Devices

In most BYOD programs, hardware costs are the first to go, which is probably why the trend is so often perceived as a big win, cost-wise. In actuality, however, because many companies enjoy volume discounts, hardware savings amount to about $10 per month when spread over the typical 18- to 24-month device lifespan, Park says. This is trivial compared with the other support, usage and management costs associated with mobility, he says.

A complication can also arise for employees with older devices, who may ask for upgrade stipends if mandatory corporate apps require more processing power than their models provide, DeBeasi says. "The policy should require employees to keep their hardware and software at minimum specified levels," he says. "Getting the policy right today saves money down the road."

IT Roadmap Washington, D.C., will be returning to the Walter E. Washington Convention Center on Dec. 6, 2012. IT Roadmap is a regional one-day technology event that features a full-day conference program, and an exposition hall with leading technology providers. *tinyurl.com/bpaymlr*

COST CATEGORY 2
Support

A similar BYOD misconception is that support costs can be completely pushed onto the employee. In reality, since the device is partially a corporate asset and supporting business functions, some level of corporate support is required, Park says. "It's difficult to toss off much of the support costs," he says. "At the end of the day, when employees are having trouble getting into the network or dealing with corporate software, they'll have to go back to the help desk."

Companies can control costs by sharing support responsibilities with employees, but the key is clearly defining the level of support they will provide, DeBeasi says. For instance, companies might agree to cover issues with enterprise email and Web access to corporate data but not hardware or operating systems. Jeff Hunter, vice president at Booz Allen Hamilton, agrees. "If I'm having an issue because of version control on a certain app, I might not call the help desk but the provider of the service," he says.

Self-support mechanisms can also defray costs, DeBeasi says, such as email distribution lists for BYOD employees to communicate with each other, and knowledge bases or SharePoint sites to store FAQs, useful instructions, answers to common problems and information on who to call for particular issues. By setting up an interactive voice response system, you can ensure the help desk does not get bogged down with issues it is not prepared to resolve by giving employees one number to call that offers prompts for guiding them to who can handle their issue, whether it's the help desk, the carrier or the device or software provider, Park says.

The most effective way to control support costs, Park says, is to limit the variety of devices you agree to support, although this admittedly detracts from the BYOD value proposition.

COST CATEGORY 3
Infrastructure

By allowing BYOD, companies sign themselves up for a raft of new foundational software investments, Hunter says, including software and systems to manage devices; to secure data, applications, devices and the network; and to enable enterprise connectivity. This can range from mobile data management (MDM) systems to virtual networks and wireless LAN security systems.

► *See* **BYOD,** *page 21*

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techdebate

EXPERTS FACE OFF *on the* HOTTEST TOPICS

Security: On-premise or in the cloud?

On-premise security can't be beat

Daniel Ayoub, CISSP, CISM, CISA, product marketing manager, Dell SonicWALL

WHILE SOME SECURITY SOLUTIONS, SUCH as email security, may ultimately be better suited for the cloud, network security will always be best handled on-premise.

Network security tools such as next-generation firewalls and next-generation IPS will remain on-premise because organizations will need to control the flow of data into and out of their networks. The latency, delays and risks associated with running confidential data to/from a cloud provider are greater than organizations will be willing to tolerate.

Further, most modern on-premise solutions automatically update themselves with the latest protection and often leverage the cloud to provide a second layer of defense. For example, some tools block malware at the edge of the network by utilizing a cloud database with millions of signatures. However, that type of service would typically be optional.

While it is true that some things are easier to administer through the cloud, security is not one of them. By its very nature security is something most organizations will want to keep in-house rather than turning over confidential data (even if encrypted) to a cloud provider. Services such as DDoS protection can benefit from cloud deployments, but then again, this is something that would be better handled at the ISP level.

Different organizations will have varying risk tolerances which will contribute to what type of solution they choose. For example, a risk-averse organization such as the Department of Defense may insist upon keeping all data internal and require an on-premise solution, whereas organizations with less sensitivity may favor a cloud-based answer.

In many cases these risk-tolerant companies (such as small businesses) may be the niche in which cloud providers are able to scrape by and fine-tune their technology. However, it is important to note that the TCO of an on-premise solution such as an integrated UTM appliance will often be lower than a similar cloud service. When one calculates the total cost of a four- to five-year contract with a monthly recurring charge, it can turn out that on-premise solutions are cheaper in the long run.

Dell SonicWALL's core business will remain

► *See* **On-premise,** *page 19*

Cloud-based security is critical

Rand Wacker, vice president of products, CloudPassage

ADOPTION OF CLOUD SERVICES IS happening at breakneck speed, with companies adopting everything from software to infrastructure as a service because of the promise of increased agility, lower capital costs and streamlined operations. Protecting dynamic cloud resources requires security that is equally dynamic, with the same scalability and portability as the resources being protected. This new environment demands cloud-based security.

Unlike traditional on-premise security systems, cloud-delivered security services can scale and react faster than static deployments, matching costs to usage more closely than the on-premise need to build out extra capacity to meet possible future growth. Most importantly though, only a cloud-delivered security service can match the dynamic and highly automated operations model that attracts so many organizations to the cloud in the first place.

Let's look at a specific example: enabling self-service provisioning of infrastructure resources. Making it easy for a developer to spin up a virtual cloud server in minutes can massively reduce the time required to deliver software. If the developer had to wait for IT staff to provision the system or the security operations team to make all the necessary changes for access control, integrity monitoring and intrusion detection, the benefits of self-service would wash away.

As in an on-premise data center, there are a litany of security steps that must be taken when a new server is brought online. To truly provide the benefit of the self-service server deployment, these security tasks must be automated. Firewall and access control policies must be updated, the server image must be verified to be in compliance with security policy, and all software packages have to be up to date.

Furthermore, since these cloud servers are directly exposed to the Internet (as opposed to being locked up in a private data center), they must be monitored constantly for compromise and unauthorized malicious or accidental system changes.

Unless these tasks are automated and delivered in a way that can keep up with the highly dynamic cloud systems they are protecting, developers will either work around the security controls, or be delayed in getting their job done.

► *See* **Cloud,** *page 19*

Security is better:

Cast your vote and see comments at tinyurl.com/bbz5e4e

▶ **On-premise,** *from page 18*

on-premise solutions, but we currently leverages cloud technology for various aspects of protection. Examples of technologies that will live in the cloud include email security, hosted management and various aspects of our gateway antivirus.

Cloud-based security does offer some advantages. Placing your network security in the cloud allows businesses to free up capital and personnel because the upfront cost to deploy is lower than traditional premise-based tools and the vendor provides the bandwidth, IT staff and infrastructure to secure the data.

On-premise security tools, on the other hand, offer a level of security and control that's simply not possible in the cloud. An on-premise solution provides businesses with control over all the data, managed and handled by their own dedicated IT staff. On-premise solutions also provide significantly better threat protection than that available in cloud deployments.

The right solution will be scalable to manage even rapid corporate growth while upgrades can be scheduled to minimize business disruption. The rich feature set of on-premise network security systems makes it easier to integrate and tailor features tightly to the needs of a particular industry. This includes the ability to perform network forensics quickly and easily. All things considered, the long-term costs can be greatly decreased, especially for larger organizations, with on-site network security. ■

Dell SonicWALL provides intelligent network security and data protection solutions that empower customers and partners to dynamically secure, control and scale their networks. Visit http://www.sonicwall.com.

▶ **Cloud,** *from page 18*

The adoption of new security services has always lagged the adoption of new IT systems, as it takes time for security challenges to be understood, addressed, and validated. While early adoption can happen in a new market without complementary security capabilities, growth of cloud adoption will hit a wall where the security problems need to be solved before the majority of adopters will embrace these disruptive technologies.

In adopting cloud computing models, operational thinking and risk management will shift from a belief that "we must control everything" to a model of shared responsibility between buyers and their service providers. Security designs will evolve so that different parts of the stack will be managed by different entities, and a framework for attestations between the different layers will be used to achieve end-to-end compliance of the level people have in private data centers today.

For the same reasons that delivering applications and infrastructure from the cloud has many benefits, cloud delivery of security offers a lower cost of entry, easier operations and improved agility. For securing the IT of organizations that employ a combination of mixed infrastructures, the use of cloud-based security services like Halo from CloudPassage will in fact increase their protection by providing more automation and enabling new operational models that significantly improve business pace. ■

CloudPassage is the leading provider of security for cloud-based servers (rand@cloudpassage.com).

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NETINSIDER | BY SCOTT BRADNER

If the Internet is magic, why can't we vote on it

REGULAR AS clockwork — just after an election which generated far too many stories of people waiting far too long to vote (and far too many local election officials saying that everything went fine and that there were no problems) — come the calls for voting via the Internet. The press wonders if we are a third-world country, politicians posture and most security experts say "don't go there."

Some examples:

*A headline in *The Washington Post* was "Estonia gets to vote online. Why can't America?"

*New Jersey tells people they can vote via email.

*A famed Russian computer security expert is quoted by the BBC saying that "the lack of well-established online voting systems is a real threat to the democratic nations of the Western world" (because kids will not vote if they can't do it online).

Anyone who has not been comatose these past few years already knows why we don't vote over the Internet. Most vendors of electronic systems are generically incapable of producing secure ones. Just Google "voting machine security" for many examples, and if that is not enough try "SCADA security."

Most of the articles that ask why we are not doing Internet voting answer their own question. Estonia can do Internet voting because everyone has a government issued scannable ID — the U.S. does not have such a thing. Apparently the voters in Estonia trust the government to not figure out who voted for whom — I kinda doubt that the U.S. population would be so trusting of its governments.

An article in *The New York Times* on the topic of Internet voting quoted MIT's Ron Rivest, observing, "One of the main goals of the election is to produce credible evidence to the loser that he's really lost." A hackable system, as an electronic voting system would inevitably be, would not be able to produce such credible evidence.

I just watched the ending of the History Channel's "The Men Who Built America" series. One thread showed the 1896 U.S. presidential election between William Jennings Bryan and William McKinley. Bryan had spent a lot of time campaigning against monopoly businesses and the exploitation of workers. Among his targets were J.P. Morgan, John D. Rockefeller and Andrew Carnegie — the main subjects of the series. Morgan, Rockefeller and Carnegie decided that they needed a president who was on their side, so proceeded to essentially buy the election for McKinley.

Buying a president took some work and money in those days. It would not take much of either to buy a president in an environment where we were using Internet voting equipment manufactured by the current set of vendors, who seem to have no clue when it comes to security, to select our president.

Fixing the far-too-long lines at some polls would be a good thing to do, but not at the expense of making it probable that some 13-year-old kid in Eastern Europe decides who gets elected.

Disclaimer: Many people at Harvard worry about the fairness of elections, but I have not heard that any of them have expressed an opinion on hackable elections, so the above view is mine. ■

Bradner is Harvard University's technology security officer. He can be reached at sob@sobco.com.

TOOLS

Realtime's push beats Ajax pull

How's that there cloudy thing working out for you? Sure, you get flexible, elastic infrastructure at a pretty good price, but what about your data transfer costs? The same question applies to "traditional" hosted apps; data transfer costs can mount up quickly for large client populations.

Mark Gibbs' Gearhead

If your online clients do any kind of frequent or quasi real-time data retrieval, such as regularly polling your servers for updates, then you're probably getting used to writing pretty large checks.

The problem is that every "pull" by a client (open a socket, request data, close the socket) doesn't necessarily return an update, so you will be wasting bandwidth (and therefore money)for each "pull" where there's no new content.

So how often should you "pull"? Well, you can either poll the server very frequently, in which case a large percentage of update requests will return no data, or you can poll less frequently at the risk of the client getting a delayed update. If your objective is to provide, say, real-time breaking news headlines, then to be the top news provider you'll probably design the client-side code that "pulls" the headlines from your server to make very frequent updates to keep your edge over other news channels. But the more frequent those "pulls" when there is no update, the more bandwidth is wasted.

Is there a better way? Yep. Rather than pulling data from servers, how about pushing it to clients? When you use a push model the client-side code opens a connection to your server and then waits either to be told there's an update to be fetched or the updated contents are actually sent.

This push model is something we see built into many apps on Apple platforms for notifications and conceptually it's pretty simple. In practice, building a push infrastructure that can operate globally with low latency is a serious engineering task, but a Portuguese company, Realtime, has solved this problem.

Is there a better way? Yep. Rather than pulling data from servers, how about pushing it to clients?

Realtime offers the Realtime Messaging System & Framework, which consists of the Open Real-time Connectivity (ORTC) framework (a cloud-based many-to-many messaging service) and the "eXtensible RealTime Multiplatform Language" (xRTML).

The ORTC network is Realtime's secret sauce, providing low-latency message transfers simultaneously to millions of clients. (The company's site has a demo of its technology on its homepage that shows, via ORTC and xRTML, the performance of ORTC. At the time of this writing it is handling 706,506 messages per second and has serviced 165,668,475 connections in the last 24 hours.)

What's really cool about Realtime's xRTML is how easy it is to build into a Web app (the company provides libraries for JavaScript, PHP, ASP.Net, Java and ActionScript, as well as plug-ins for WordPress, Eclipse and Joomla, and an extension for VirtueMart).

Realtime also has great demos and tutorials. For a good intro to using xRTML, try the "Getting Connected" interactive example (tinyurl.com/c6p5qdm) after you sign up and receive your developer key and authorization token.

The cost of using Realtime is very reasonable (and compared to a "pull" system, it's really inexpensive) at 0.7 cents per visit (that's a client connection for 30 minutes or less) and $1 for each additional 1,000,000 messages after your first 1,000,000, which are free.

If you're building a Web application which requires unpredictable data updates, will support millions of connections, and operates globally, this is the technology to use rather than an Ajax-based approach, unless you really want to go broke. Realtime and its xRTML and ORTC system gets a Gearhead rating of 5 out of 5. Now that cloudy thing will not only work better, it'll cost a whole lot less. ■

Gibbs is cloud watching in Ventura, Calif. Your observations to gearhead@gibbs.com and follow him on Twitter and App.net (@quistuipater) and on Facebook (quistuipater).

▶ **BYOD,** *from page 16*

According to DeBeasi, MDM systems alone cost $3 to $5 per device per month, which adds up when you support hundreds or thousands of devices. Layering in VPN and network security can ratchet that up to $15 to $20 per month per device and higher for organizations with specific encryption and compliance needs, Park says. "At this point, smartphones and tablets require the same level of security that exists on PCs," he says.

COST CATEGORY 4
Wireless infrastructure

With more devices coming onto the network, companies will invariably need to ramp up their wireless infrastructure, DeBeasi says, whether that means upgrading, adding more access points, creating another SSID or a complete network redesign. The same goes for the mobile cellular network, if employees subscribe to numerous carriers. "Employees might bring in devices from Sprint or T-Mobile, and if there are dead zones, investments may be needed in a distributed antenna system or cellular upgrade," DeBeasi says.

COST CATEGORY 5
Software and services

Because BYOD encourages employees to work from anywhere, it can easily result in software and services purchases that enable them to work during what used to be their downtime. Examples include an iPad editing app or a cloud-based storage and syncing service, such as iCloud or Dropbox. This can be great for productivity, but it can also add up to unexpected expenses when not controlled, DeBeasi says. "As I do my editing at the pool, using the app I just bought, I might submit the cost as a business expense," he says. "It's only $30 — you're not going to reimburse that?"

Whatever the company decides, other complications arise, such as who owns and manages the software license, especially if the employee leaves the company. The important thing, DeBeasi says, is that these decisions are spelled out in the policy and not left open for interpretation.

COST CATEGORY 6
Telecom charges

With voice and data costs reaching $100 per month, according to Park, determining who pays for what and setting monthly limits is a key area that can make or break the BYOD cost equation, he says. This is particularly true as the world moves to 4G, and it becomes ever easier to send large data files, DeBeasi says.

"At the end of the day, the biggest contributor to BYOD savings is how much the company reimburses for telecom and data costs," Park says. "If you pay the full amount of what the individual is billed, there is not going to be any savings. If you set a limit that is below what it would have cost for a corporate-owned device, that's where the savings comes in."

The range of approaches varies widely, Park says. While some organizations pay for the entire monthly telecom bill, others identify a specific stipend, and still others try to split up the bill in terms of business vs. personal use, by analyzing calls, usage and times of day.

The first option is not ideal unless companies pool employees into a single plan and benefit from the discounted corporate rate vs. paying for individual or family plans, Park says. The third option is costly from an internal labor standpoint.

The best approach, he says, is to offer a set stipend that is inserted directly into the employee's paycheck rather than submitted monthly through an expense account. While this requires some upfront work to determine the right stipend allowance and figure out the tax implications, Park says, it's less labor-intensive than monthly expense processing, which can be an extra $10 per month for each BYOD employee.

Conclusion

Clearly, BYOD should not be pursued solely for its cost savings potential. "It is difficult to get savings when you add up all the various components of mobility," Park says. The strongest levers the enterprise can pull are in the areas of support, telecom and data expenditures, in terms of shifting cost to the employee. In fact, he says, companies concerned about mobility costs should consider whether to take a BYOD approach or carve out a corporate-owned strategy, in which employees choose their own devices and services but within a company-defined menu selection, allowing them to take full advantage of the ability to scale savings.

"The cost equation for BYOD will be almost cost neutral," Booz Allen Hamilton's Hunter says. Over time, however, as BYOD practices and strategies mature, he says, the investment will very likely generate a return, whether in the form of cost savings or other corporate value. "It's like with any technology adoption in the last 20 years, where cost is not the main driver, and instead agility, flexibility and increased productivity are." ■

Brandel is a freelance writer. She can be reached at marybrandel@verizon.net.

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TEXT **KEITH SHAW**

2012 COOL YULE TOOLS

BEING A TECHNOLOGY FAN IS HARD WHEN THE holidays come around. Not only are there thousands of potential consumer electronic products looking to be purchased for the holidays (and that's just counting the tablets, phones and e-book readers out there), but everyone and their sister wants to get gift idea suggestions or recommendations.

Sometimes you just want a bunch of tech heroes to save the day. Luckily, they are here. The Cool Yule Elves have been bitten — not by a radioactive spider, but rather the holiday gift guide review bug. Our team of editors and writers have pored over more than 150 different gadgets and gizmos to assemble this holiday gift guide. We guarantee it will make you a hero and make your gift recipients smile as they open the box.

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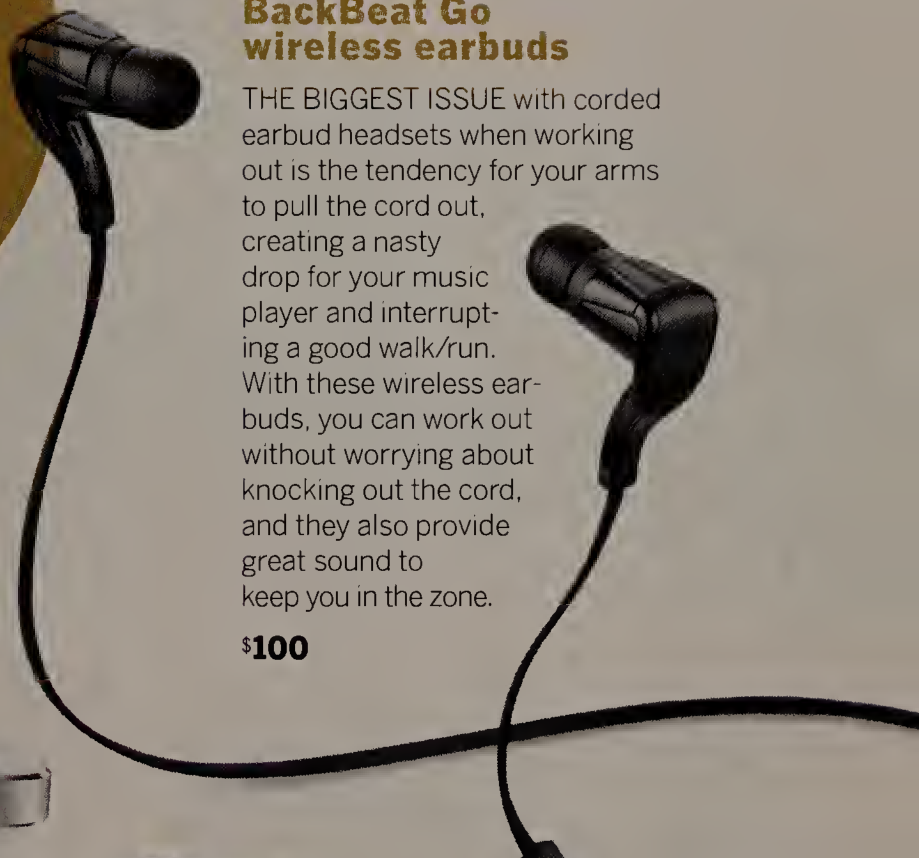
Black Swann RC Stealth

OUR FAVORITE REMOTE-control helicopter this year not only lets you fly around the office or outdoors to harass friends and co-workers, but the embedded VGA camera lets you take video of them as well. Remember that perfectly level flying is the goal here. **$100**



Plantronics BackBeat Go wireless earbuds

THE BIGGEST ISSUE with corded earbud headsets when working out is the tendency for your arms to pull the cord out, creating a nasty drop for your music player and interrupting a good walk/run. With these wireless earbuds, you can work out without worrying about knocking out the cord, and they also provide great sound to keep you in the zone.

$100

Apple iPhone 5

THE IPHONE CONTINUES to get better — the latest version offers LTE wireless access, a larger screen, faster processor, faster graphics, improved battery life and 802.11n Wi-Fi. If you haven't upgraded your iPhone in a while (or if you've never owned one), this is the one to get (at least this year). **$200**

ThinkGeek iCade 8-Bitty game controller

AS GAMING MOVES away from large consoles to more mobile devices like smartphones and tablets, you still need a controller that can move Pac-Man or your spaceship left or right without needing to use your thumb or finger. This Bluetooth controller makes game play on a phone or tablet 300% better. **$30**

Lenovo IdeaPad Yoga 13

THIS ULTRABOOK FEATURES many different flexible positions for operating — it's a notebook, tablet, viewing screen and more. Running Windows 8, this allows users more new ways of computing than they thought possible with older systems. **$1,000**

Motorola Droid Razr M (VERIZON WIRELESS)

IF THE IPHONE 5 or Samsung Galaxy S III doesn't appeal to you, try this model, which is smaller than the Galaxy S III and less expensive than the iPhone 5. Featuring 4G LTE access, a 4.3-inch AMOLED screen, Android 4.0.4 (Ice Cream Sandwich) operating system, and built-in Google Chrome browser. **$100**

Google Nexus 7 tablet

APPLE AND AMAZON may get all the 7-inch tablet headlines, but gift-givers should at least consider this tablet from Google. This slim, light and fast tablet has a gorgeous screen, a complete array of software and apps, and works as a great portable video player. You'll absolutely be thrilled after using this for about three minutes. **$200**

Pure Contour 200i Air wireless speakers

THIS SMALL YET powerful speaker system supports Apple's AirPlay wireless streaming technology, giving you room-filling sound while letting you play music from your mobile devices (iPhone, iPod, iPad). This system looks good enough to store on a shelf or bookcase in any room without screaming "gadget!" **$230**

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Samsung Smart Camera

WITH BUILT-IN Wi-Fi and GPS and an amazing 21x optical zoom, you might ditch the smartphone and start bringing this along the next time you need to capture some cool shots. Video recording at 1080p also helps, along with innovative software on the camera that can shoot in tons of different modes. The camera even has a nice video slideshow/movie creator, giving studio-quality videos based on the photos and videos you take. **$380**

Plantronics GameCom Commander headset

SERIOUS GAMERS will appreciate the audio quality, voice capabilities and customization features that personalize this headset. We appreciated the flexibility with its cords that let you use this for watching movies, sitting on an airplane or just chilling out to listen to tunes. **$300**

Libratone Zipp speakers

WIRELESS SPEAKERS SEEM to be the rage this year, and we were highly impressed with the portable Zipp speakers with changeable, zippable covers. The speakers produce great 360-degree sound via Apple's AirPlay feature, as well as a direct Wi-Fi mode that can play without being connected to an internal WLAN. Bravo! **$450**

Tely Labs telyHD

CONNECT THIS DEVICE to your HDTV and then make free Skype video calls to friends and family. HDMI output from the camera produces a greater picture than a tiny laptop webcam, and your whole family can sit on the couch instead of crowding around a tiny laptop during video chats. **$250**

NuGreen Flexible Neck LED Desk Lamp

REPLACING A TRADITIONAL Light bulb with smaller LED lights, this desk lamp not only reduces energy needed to light your desktop, but also reduces heat output. The touch-enabled on/off switch makes us happy, too.

$70

Autodrive USB flash drive

WHILE YOU MAY never be able to afford a Porsche 911 Carrera, you can buy this version, which not only is a cool die-cast car, but also provides 8GB of storage space via a USB port that pops out from the back. Working headlights also blink when data is being transferred. An awesome stocking stuffer for someone (giant bow not included).

$15

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Samsung Galaxy S III

LIKE COKE VS. Pepsi, in the battle of smartphones it's iPhone vs. the Galaxy S III. Just like your personal preference determines your choice of cola, so does your choice of smartphone. Among other features, we love the S III's large 4.8-inch AMOLED screen, the 1.5GHz processor and 8-megapixel camera that can shoot 1080p video. **$200**

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We have more than 150 reviews of even more products available at tinyurl.com/bvatbe3. Be sure to use your fancy new notebook, smartphone or tablet to check out the online guide, including After Hours suggestions for toys, video games and other fun stuff!

GoSmart Stylus 200 Series

SOMETIMES YOU GET tired of smudging your finger all the time on your smartphone or tablet, and want to have the feel of a pen for handwriting, drawing or other apps that need a delicate touch. This stylus may look bizarre, but it's got the accuracy that those apps need. **$25**

Kindle Fire HD (7-inch), by Amazon

IF YOU'RE IN the market for a 7-inch tablet, you now have many choices with offerings from Google (Nexus 7) and Apple (iPad Mini), among others. But we were most impressed with the Kindle Fire HD, which offers a fantastic interface, outstanding sound (via Dolby Digital) and media content offerings that rival the other two tablets. With a price tag starting at $200, this device should be on your short list. **$200**

Marshall Headphones Minor earphones

AT FIRST GLANCE these large earbuds may frighten you off, but they produce outstanding sound quality and provide a great seal for keeping outside noise away from your eardrums. **$60**

Earloomz GL-500 Star Wars headset

AT LESS THAN $20, this is the perfect stocking stuffer for any "Star Wars" fans on your list, providing them with a hands-free Bluetooth headset that doesn't need a knowledge of the Force to operate. **$18**

Jabra Solemate wireless speakers

WE ABSOLUTELY LOVED the high-quality sound and range of these Bluetooth speakers, and setting them up didn't require a Ph.D. in wireless technology. The rubber-soled bottom prevents slipping as well as helps produce excellent bass sound. **$200**

Cool Yule Elves Roster Call

Special thanks to our testing/writing elves:

Jen Finn, Craig Mathias, Dan Hunt, Tom Lupien, Mary Lester, Ryan Francis, Neal Weinberg, Abigail Weinberg, John Dix, Jon Gold, Tim Greene, Brian Hawthorne, Rari Hilditch, Ken Mingis, Colin Neagle, Shane O'Neill, Juan-Roberto Ortiz and April Ramalho

▶ **4G,** *from page 1*

The carriers are not forthcoming on the number of 4G or LTE subscribers they have. AT&T says "more than 40% of ... post-paid smartphone customers use a 4G capable device." T-Mobile says "nearly 60% of our customers ... carry smartphones, and over half ... are 4G capable." Verizon says nearly "12% of our 89 million retail postpaid connections are 4G LTE as of the 2nd quarter of 2012."

Sprint still offers 4G service based on WiMAX, but in July began deploying LTE. T-Mobile has been expanding its HSPA+21 and +42 network, which is technically considered 4G, and delivers strong performance in several large-scale tests, most recently by RootMetrics' biannual "Need for Speed" report.

But investments in LTE are staggering. T-Mobile announced early in 2012 its $4 billion plan to re-equip 37,000 cell sites and refarm radio frequency spectrum to support LTE, focusing first on the top 50 U.S. markets. AT&T announced in November 2012 that it will spend $8 billion "for wireless initiatives" focused on LTE build-out over three years. By year-end 2014, AT&T says its LTE service will cover 300 million potential subscribers.

While 4G promises carriers more efficient spectrum use, greater capacity and the benefits of an all-IP network, the benefit for users is data rates that are much faster than 3G. Verizon Wireless and AT&T say LTE subscribers — on a fully loaded network — can expect average downlink speeds of 5Mbps to 12Mbps and 2Mbps to 5Mbps on the uplink. By comparison, Verizon's EV-DO Rev. A 3G network supports average downlink speeds of 600Kbps to 1.4Mbps and 500Kbps to 800Kbps uplink.

But actual performance can vary widely, as the RootMetrics data also shows. That's because LTE networks are still being built and tuned, and the number of LTE subscribers is still small compared to 3G.

Who has 4G?

Much of the confusion is due to the fact that multiple radio technologies are labeled "4G" by the carriers. Verizon says it has the largest 4G LTE network, while AT&T claims it has the largest 4G network. What's going on?

"The term '4G' has fallen into the hands of the marketing departments," says Roger Entner, founder of telecom consulting firm Recon Analytics. "Everything a carrier now sells you is sold as 4G. ... They give you '4G LTE' and the 'regular' 4G. That's the hint. LTE is generally the faster."

Technically one can argue that no carrier today offers a true 4G service. That's because the ITU outlined what it considers "next-generation" cellular in its IMT-Advanced specification, which is being embodied in two detailed technology specifications, LTE-Advanced and WirelessMAN-Advanced, sometimes called WiMax 2. LTE-Advanced, for example, will deliver up to 1Gbps for a slow-moving mobile user and up to 100Mbps for one zipping along in a car or train, far above existing LTE speeds.

The most 4G?
Define most — and 4G

The most LTE: Verizon Wireless is in 440 cities as of November 2012. AT&T is in 80 cities, Sprint in 32. T-Mobile will launch LTE, based on the high-powered LTE-Advanced spec, in 2013.

The most 4G – HSPA+: AT&T adds its LTE locations and its HSPA+ locations and says the total is 2,000 cities and towns more than Verizon's LTE network.

The fastest 4G – HSPA+: T-Mobile's HSPA+ network combines sites with HSPA+21 and most recently HSPA+42. All told, the carrier says today it offers "superfast" 4G in 229 markets; HSPA+42 is turned on in 185 markets.

Yet neither of these has yet been implemented (though T-Mobile USA says it will begin deploying LTE-Advanced in 2013). But with carriers claiming they offer 4G, in December 2010 the ITU issued a release saying "it is recognized that this term ['4G'], while undefined, may also be applied to the forerunners of these [LTE-Advanced and WiMax 2] technologies, [to] LTE and WiMax, and to other evolved 3G technologies providing a substantial level of improvement in performance and capabilities with respect to the initial third generation systems."

This means that anyone using LTE, WiMax or HSPA+ today is using "4G." All of these networks deliver far more megabits per second than most existing, older 3G networks.

The most

So who has the most 4G coverage? It depends.

If you're asking about LTE, it's generally accepted that Verizon has by far the largest number of locations with LTE service. On Nov. 15, the carrier announced it has LTE in 440 U.S. markets or cities, faster than originally planned. It expects to complete its initial LTE build-out by mid-2013.

A distant No. 2 right now is AT&T, which claims 80 and promises to have 100 markets covered by year-end. Third of the Big Four is Sprint, which began rolling out LTE in June: It's now in 32 cities.

But these numbers change weekly, sometimes daily. Eighteen months from now, at least in the major markets, there will be little difference in the size of the LTE blankets offered by the Big Four carriers. And there are regional carriers with expanding LTE service: MetroPCS, which was actually the first to go live with LTE, and U.S. Cellular are examples.

AT&T doesn't claim to have the biggest LTE network, but it does claim to have the biggest "4G" network — a network that includes two cellular technologies: LTE and HSPA+, which now overlays its older nationwide 3G network. AT&T adds its LTE locations and its HSPA+ locations to say it offers "4G" in 2,000 more locations than Verizon today offers LTE.

T-Mobile doesn't claim to have the biggest 4G network, but it does claim to have the fastest. The carrier has aggressively invested in HSPA+, continually upgrading to faster and faster flavors, most recently the highest performing 42Mbps flavor. And, just as aggressively, it markets this as 4G.

Tests by *PC Magazine*, and most recently RootMetrics, show T-Mobile's HSPA+ network often overlaps and sometimes beats Verizon's LTE download performance, though Verizon can far more often top 15Mbps. Via email, T-Mobile says its "nationwide 4G" network is available in 229 markets, reaching well over 220 million potential customers. HSPA+42 service is a subset of that coverage: It's in 185 markets, with 184 million potential customers, and growing.

The term "most coverage" is often wrongly understood or interpreted as "best coverage." Either way, it's an irrelevant metric to the vast majority of subscribers. "Ninety percent of the people stay 90% of the time in the same place," Entner says.

For example, on Nov. 12, Verizon Wireless announced it was expanding its LTE network in the Lake of the Ozarks area, a popular vacation spot in central Missouri. One of the lakeside communities around the lake is Osage Beach, with a 2010 census population of 4,351 people. LTE service may be a godsend to those who live in, or visit, Osage Beach; the news may have been greeted by dancing in the streets. But the vast majority of Americans, and possibly even of Missourians, will never see the town or use Verizon's network there.

For any given wireless subscriber, the question is never, "Does Carrier X have 4G coverage in hundreds of U.S. locations?" — the question is always, "Does Carrier X have 4G where I live and work?" For companies with a field sales or service staff, the question is only somewhat different: They may need coverage in more locations, but they are still specific locations — they rarely need cellular access from every point in all 50 states. ■

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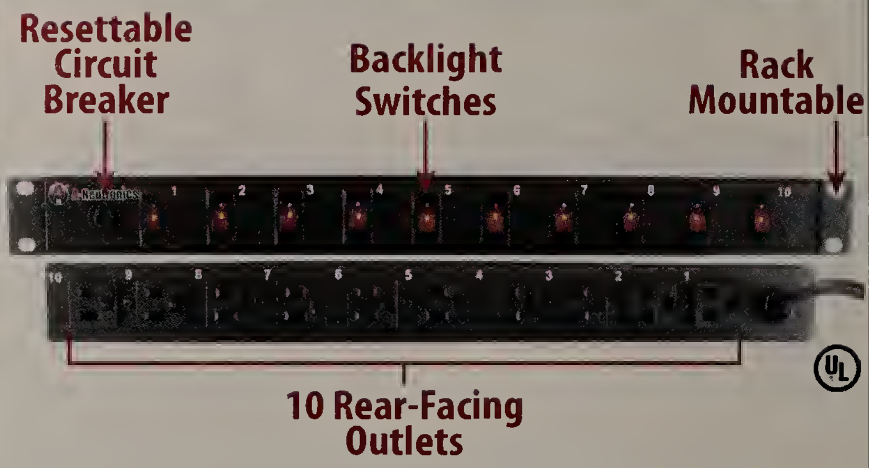

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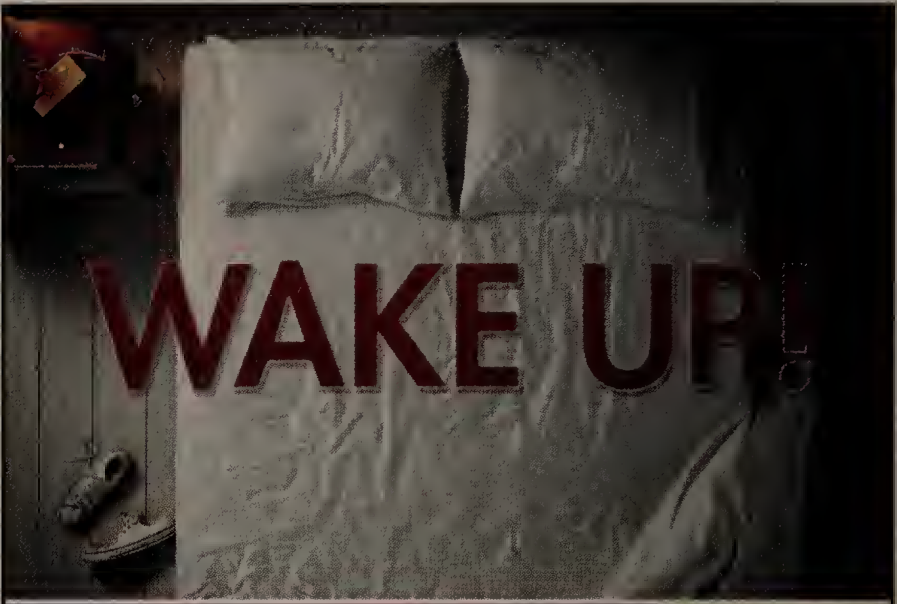

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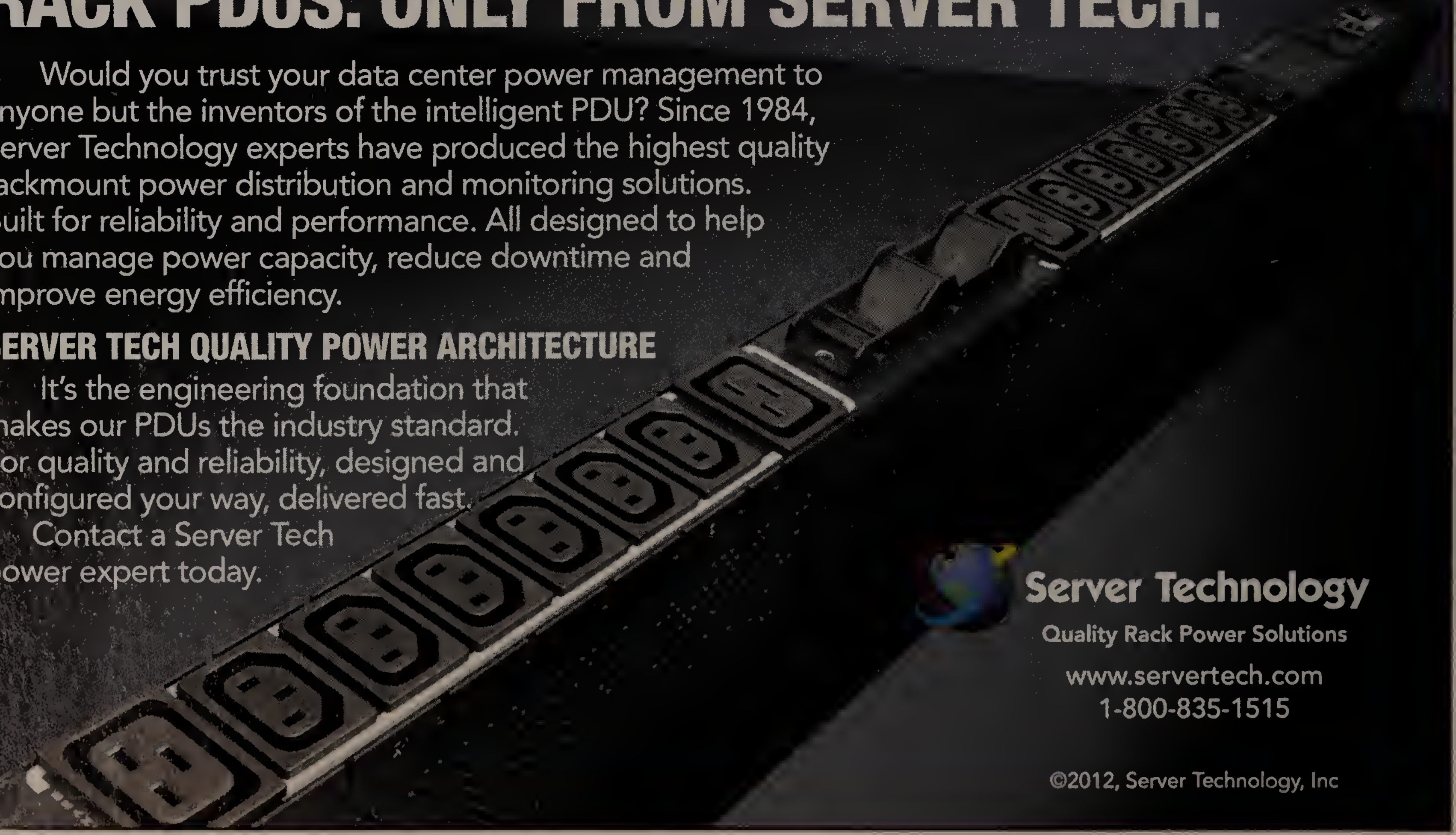

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BACKSPIN | BY MARK GIBBS

The 9th annual Gibbs Golden Turkey Awards

[CLINK, CLINK] A-hem . . . may I have your attention please? Thank you. We are gathered here in the Gibbs Universal Secret Underground Bunker for the ninth year to announce the lucky finalists and even luckier winner of The Gibbs Golden Turkey Awards.

To refresh your memory, the GGTAs point the digit of disdain at those individuals, companies or entities that don't, won't or can't come to grips with reality, maturity, ethical behavior and/or social responsibility because of their blindness, self-imposed ignorance, thinly veiled political agenda, rapaciousness and greed, or their blatant desire to return us to the Dark Ages. Or all of those sins combined.

This year, we have a full field of nominees whose heads have been suggested by readers, associates and by the casting of runes and examination of goat entrails. This year the contenders for the Dinde d'Or, as the French might say, are a diverse lot and each nominee gets a Tiny Golden Turkey for their efforts. So, without further ado ...

First up, Zynga for abusing its stock and being worth less than its cash on hand and completely obliterating the value of all employee options while senior execs cashed out hundreds of millions. I wonder whether there will be a Tiny Golden Turkey in FarmVille in the future?

Next, we have the entire advertising industry. You can single out the IAB or the DMA or any other industry organization. This is an industry that insists that "Do not track me" actually means, "OK, track me all you want, but just don't send me ads of any possible interest." Perhaps the advertising industry should get a Golden Cookie?

In the anti-science nominees category, we have Karl Rove and Donald Trump, along with every gum-flapping imbecile who thought his personal opinion was more valid than statistical analyses. Roger Bacon, born 800 years ago, wrote: "The knowledge of mathematical things is almost innate in us. This is the easiest of sciences, a fact which is obvious in that no one's brain rejects it; for laymen and people who are utterly illiterate know how to count and reckon." Messrs. Rove and Trump are each awarded a TGT.

Rather disappointingly, Google was nominated for allowing there to be more than 3,800 versions of Android? What ever happened to homogeneity? Google gets 3,800 TGTs, all slightly different.

The runners-up this year are the ISPs that don't filter spoofed source addresses that are outbound from their networks. Imagine all the UDP DDoS attacks that would fail if they did. This group will get billions of TGTs every second.

And so, we come to this year's winner .... a roll on the drums, please ... Ladies and Gentlemen, this year's recipient of the Gibbs Golden Turkey is ... Facebook!

Yes, Facebook's over-hyped IPO took in a ridiculous number of people who then got to watch the stock slide from its initial $38 to its current price of around $22 ... a loss of more than 40%. While all of the early investors get TGTs that will shrink when exposed to reality, Facebook itself gets the Big Golden Bird, not only for its ongoing privacy issues, but also for its weak business model (the recent Mark Cuban fracas underlines this nicely).

So, thanks to all and, Zuck, call me to claim your prize ... ■

Gibbs is rolling up the red carpet in Ventura, Calif. Tell him what you think at backspin@gibbs.com.

NETBUZZ | BY PAUL MCNAMARA

30 years later, it's an unimaginable hack

EVEN BACK in 1982, the astonishing emergence of a large black weather balloon from beneath the field during the annual Harvard-Yale football game was enough to have police officers drawing their guns.

Today? SWAT teams and bomb squads would be the least of it.

So imagine if at last Saturday's 129th meeting between the football squads of Harvard and Yale, an MIT fraternity had pulled off such an audacious hack. Imagine that as the second quarter unfolded, so too did a large and rather ominous-looking black weather balloon that had been buried beneath the turf, then inflated by a Freon-driven hydraulic press and vacuum cleaner motor.

In 1982, the general reaction to this having occurred for real was surprise and bemusement, at least aside from those drawn police pistols.

If it had happened last Saturday? You could expect that mass panic would have kicked in as soon as that balloon was inflated enough to be seen from the stands. The stampede for the exits would have left many injured and perhaps some dead. Those in attendance who knew the history of this game and its attractiveness to geeky pranksters would have done their best to try and calm the situation, but this is 2012 and ... that ... balloon ... was ... about ... to ... burst! The resultant plume of smoke would have sent even the history buffs running for dear life.

Thirty years ago the weather balloon's explosive demise signaled to everyone on hand that the mischief was over and it was now time to clean up the mess, repair the small hole in the field and resume the game, which Harvard went on to win 45-7. (I'd tell you who won Saturday's game, but if you haven't figured it out by now I am writing this before it was played.)

The game actually went on. Try to imagine such a reasonable reaction in our make-believe reliving of the event this past Saturday; I mean try to imagine the game continuing even if the terrified fans hadn't already beat feet out of the stadium.

No, there would be SWAT teams and bomb squads descending on Harvard Stadium with post-9/11 urgency. Not even these professionals, however, would be approaching that hole in the ground; they'd be flying a drone over it while the bomb-sniffing robot got up and running.

There would be no more football played at Harvard Stadium on such a 21st century day; are you kidding me? And, since the "crime scene" would require a thorough going over by local, state and federal investigators, it would be at least a month before any kind of game at all was played there.

Back in 1982, the balloon prank garnered so much national publicity that the pranksters, members of the Delta Kappa Epsilon fraternity, held themselves a self-congratulatory press conference.

The 2012 balloon pranksters would not be holding any press conferences because they'd be too busy being arrested, arraigned and jailed without bail on charges ranging from domestic terrorism and bomb making all the way down to violating the city of Cambridge noise ordinance.

Prison sentences would be awaiting them.

This is 2012, after all. If you want to be a geeky funny guy, you need to build yourself a WABAC Machine. ■

Comments in the present should be directed to buzz@nww.com.

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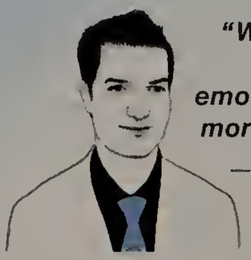

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